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TECHNICAL SPECIFICATION

colour inside

Guidance on material circulation considerations in environmentally conscious design

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GUIDANCE ON MATERIAL CIRCULATION CONSIDERATIONS IN ENVIRONMENTALLY CONSCIOUS DESIGN

FOREWORD

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IEC TS 63428 has been prepared by IEC technical committee 111: Environmental standardization for electrical and electronic products and systems. It is a Technical Specification.

The text of this Technical Specification is based on the following documents:

Draft	Report on voting
111/759/DTS	111/772/RVDTS

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Technical Specification is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

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INTRODUCTION

The circular economy can be described as a systemic approach to the design of processes, products (including services) and business models, that tackles global challenges like climate change, resource depletion, biodiversity loss, waste, and pollution. It is based on the principles driven by design: eliminate waste and pollution, decreasing the use of resources, circulate products and materials (at their highest value), and regenerate nature. As such it focuses on managing resources more effectively and increasingly closing material flows. Changing from the traditional linear economy to a circular economy represents a paradigm shift in the way that society and natural capital are interrelated.

Different geographies have already introduced or are expected to introduce soon, the concept of circular economy into their legal systems. Standards can assist the effective adoption of legislation. It is important that the international community speed up addressing this topic, for example, CEN and CENELEC are already doing this in Europe on the assessment of the different aspects of material efficiency such as durability, ability to repair, reuse and upgrade, recyclability and recoverability, proportion of reused components, proportion of recycled content, and the ability of a product to be remanufactured.

Current IEC standards deal with functional approaches and dependability topics. Both can support material circularity optimization during the design phase across the different life cycle stages. Material circularity for a product can be supported by a systematic design approach taking all life stages of the product into consideration.

The design for material circularity means a design contributing to circular economy. This covers several interrelated efficiencies such as material efficiency, energy efficiency, and environmental footprint efficiency. Safety and health as functional priorities are covered by other standards.

Whereas ISO 14009 provides guidance and requirements for management systems to support incorporating material circulation in design and development, this document focuses on integrating the material circularity aspects in the design and development processes.

The design for material circularity supports innovation and technology managers, product designers and engineers by analysing the consequences of their ideas and decisions to the different life cycle stages of a product. Facilitating circulation of materials by closing the flow will assist organizations in fulfilling the objectives of circular economy, which is increasingly becoming an important objective in many parts of the world.

Environmentally conscious design (ECD) is the overarching concept applying life cycle thinking (LCT), which includes material circularity. This document, focusing on material circularity, aims at minimizing material losses and closing the material flow of the product's entire life.

This document is intended to become a horizontal document in a future edition, for example, if it becomes an International Standard.

GUIDANCE ON MATERIAL CIRCULATION CONSIDERATIONS IN ENVIRONMENTALLY CONSCIOUS DESIGN

1 Scope

This document describes principles and provides guidance on how to embed material circularity aspects into the design and development of products.

This includes making efficient use of materials and closing material flows in design and production, extending the lifetime of products through increased durability and enabling parts and materials to be reused or recycled at end-of-life.

- Closing the material flows includes the use of recycled content and reused parts.
- Durability extensions include such measures as to improve reliability and maintenance, enable and facilitate repair, provide updates and upgrades, refurbish and reuse.
- Improvements in material recyclability, parts reuse, and remanufacturing are possible through measures such as design for disassembly, separability of materials, choice of materials, traceability of materials, and durability of parts.

This document builds on the jointly published (ISO and IEC) document, IEC 62430:2019 for requirements for environmentally conscious design (ECD) processes, and it supplements ECD by adding more specific guidance on the aspects of material circularity and material efficiency.

This document only deals with material circularity of products. Economic, social and energy aspects are excluded from the scope of this document.

This document is applicable to all electrotechnical products including goods and services.

2 Normative references

There are no normative references in this document.

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at https://www.electropedia.org/
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